

What is claimed is:

1. A motor vehicle having a multimode traction system and particularly adapted for use both off-road and on delicate terrain, the vehicle comprising: a pair of rear wheels, a pair of steerable front wheels, an engine for generating torque to drive the wheels, a differential operatively connected within a drive train and supplying engine torque received from the engine to at least one of the wheels, a manually operable mode switch settable in first and second positions and located for easy operation by an operator of the vehicle while the vehicle is moving, the differential including a lock that locks the differential in response to setting the switch into the first of the switch positions, the differential lock unlocking the differential in response to setting the switch in the second of the switch positions, the differential lock being biased in the locked position so that the differential is locked when the vehicle is off to facilitate secure parking of the vehicle.

2. The vehicle of claim 1, wherein the differential locks if no signal is received from the switch.

3. The vehicle of claim 1, wherein the differential lock is located within a differential housing and is activated by electrical power.

4. A motor vehicle having a multimode traction system and particularly adapted for use both off-road and on delicate terrain, the vehicle comprising: a pair of rear wheels, a pair of steerable front wheels, an engine for generating torque to drive the wheels, a rear differential operatively connected within a drive train and supplying engine torque to the rear wheels, a front wheel coupler connected within the drive train and receiving engine torque, a manually operable mode switch settable in first, second,

and third positions and located for easy operation by an operator of the vehicle while the vehicle is moving, the rear differential including a lock for locking the differential in response to setting the switch into the first or second of the switch positions, the coupler enabling torque received from the engine to be supplied to at least one front wheel to enable front wheel drive in response to setting the switch in the first position, and the coupler disabling engine torque from being supplied to the front wheels in response to setting the switch in the second or third positions.

5        5. The vehicle of claim 4, wherein the differential is biased in the locked position so that the differential is locked when the vehicle is off to facilitate secure parking of the vehicle.

10       6. The vehicle of claim 4, wherein the rear differential locks if no signal is received from the switch.

       7. The vehicle of claim 4, wherein the mechanical apparatus for locking the differential is located within a differential housing and is activated by electrical power.

15       8. The vehicle of claim 4, wherein the coupler comprises a clutch capable of being activated by setting the switch in the first position, and the clutch, when activated, supplying engine torque via the drive train to at least one front wheel when the rotational speed of such at least one front wheel differs by a predetermined amount from the rotational speed of the rear wheels.

20       9. The vehicle of claim 4, wherein the coupler is an overrunning clutch.

       10. The vehicle of claim 9, wherein the overrunning clutch permits the front wheels to rotate freely with respect to the drive train when the switch is set to either its second or third position.

11. The vehicle of claim 9, wherein the overrunning clutch permits the front wheels to rotate freely with respect to the drive train when the rotational speed of the front wheel is about equal to the rotational speed of the rear wheels.

5 12. The vehicle of claim 4, wherein the coupler comprises a pair of overrunning clutches each mounted to a wheel hub of a respective front wheel.

13. The vehicle of claim 4, wherein the coupler comprises a central clutch located between half axles each connected to and rotating with a respective front wheel, the central clutch supplying engine torque to at least one half axle when the switch is in the first position and when the rotational speed of such at least one half axle is less than  
10 the rotational speed of the rear wheels by a predetermined amount.

14. The vehicle of claim 13, wherein the central clutch mechanically couples the received engine torque to such at least one half axle to supply engine torque to such at least one half axle.

15 15. The vehicle of claim 4, wherein the coupler separates a driving portion of the drive train from a driven portion of the drive train, the driven portion rotating with the front wheels, the driving portion rotating at a speed proportional to that of the engine speed, the coupler locking the rotation of the driving and driven portions together when the rotation speeds of the driving and driven portions are about equal and when the switch is set in the first position.

20 16. The vehicle of claim 15, wherein the coupler permits free rotation of the driven portion relative to the driving portion when the rotation speed of the driven portion exceeds that of the driving portion.

17. The vehicle of claim 15, wherein the coupler permits free rotation of the driven portion relative to the driving portion when the switch is set in the second or third positions.

18. The vehicle of claim 4, wherein the coupler supplies engine torque to the  
5 front wheels providing front wheel drive when the switch is set in the first position.

19. The vehicle of claim 4, further including a rear swing arm that carries the rear differential and the rear wheels, the rear swing arm forming a rear suspension for the vehicle.

20. The vehicle of claim 4, further comprising an independent rear suspension  
10 that includes a set of double A-arms for each rear wheel.

21. The vehicle of claim 4, wherein the differential lock unlocks the differential in response to the switch being set in the third position.

22. A motor vehicle having a multimode traction system particularly adapted for off-road use, comprising: a pair of rear wheels, a pair of steerable front wheels, an  
15 engine for generating torque to drive the wheels, a rear differential operatively connected within a drive train and supplying engine torque to the rear wheels, a front wheel coupler connected within the drive train and receiving engine torque, a mode switch settable in turf mode and traction mode positions, the rear differential including a lock for locking the differential when the mode switch is set in the traction mode position  
20 and for unlocking the differential when the mode switch is set in the turf mode position, the coupler enabling torque received from the engine to be supplied to at least one front wheel to enable front wheel drive when the switch is set in the traction mode position,

and the coupler disabling engine torque from being supplied to the front wheels when the switch is set in the turf mode position.

23. The vehicle of claim 22, wherein the mode switch is settable in a rear wheel drive mode position, and, when mode switch is set in the rear wheel drive position, the lock locks the differential and the coupler disables engine torque from being supplied to the front wheels.

24. The vehicle of claim 22, wherein the mode switch is electronic.

25. The vehicle of claim 22, wherein the mode switch is a three position switch.

26. The vehicle of claim 22, wherein the mode switch is a two position switch.

27. The vehicle of claim 22, wherein the coupler is capable of being activated by setting the switch in the traction mode position, and the coupler, when activated, supplies engine torque via the drive train to at least one front wheel when the rotational speed of such at least one front wheel differs by a predetermined amount from the rotational speed of at least one rear wheel.

28. A motor vehicle having a multimode traction system and particularly adapted for use both off-road and on delicate terrain, the vehicle comprising: a pair of rear wheels, a pair of steerable front wheels, an engine for generating torque to drive the wheels, a rear differential operatively connected within a rear drive train and supplying engine torque to the rear wheels, a front differential operatively connected within a front drive train and supplying engine torque to the front wheels, a manually operable mode switch settable in first and second positions and located for easy operation by an operator of the vehicle while the vehicle is moving, the rear differential including a lock for locking the differential in response to setting the mode switch into the first or second

of the mode switch positions, the front differential including a lock for locking the differential in response to setting the mode switch into the first of the mode switch positions and unlocking the differential in response to setting the mode switch into the second of the mode switch positions.

5           29. The vehicle of claim 28, wherein the rear differential is biased in the locked position so that the rear differential is locked when the vehicle is off to facilitate secure parking of the vehicle.

30. The vehicle of claim 28, wherein the rear differential locks if no signal is received from the mode switch.

10           31. The vehicle of claim 28, wherein the rear differential lock is located within a differential housing and is activated by electrical power.

32. The vehicle of claim 28, wherein the front differential lock is located within a differential housing and is activated by electrical power.

15           33. The vehicle of claim 28, further including a rear swing arm that carries the rear differential and the rear wheels, the rear swing arm forming a rear suspension for the vehicle.

34. The vehicle of claim 28, further comprising an independent rear suspension that includes a set of double A-arms for each rear wheel.

20           35. The vehicle of claim 28, further comprising a second switch and a coupler, the coupler located in the front drive train between the engine and the front differential, the coupler enabling torque received from the engine to be supplied to the front differential in response to setting the second switch in a first position, and the coupler

disenabling engine torque from being supplied to the front differential in response to setting the second switch in a second position.

36. The vehicle of claim 28, further comprising a coupler, the coupler located on the front drive train between the engine and the front differential, the mode switch being  
5 settable in a fourth position, and, in response to setting the mode switch in the fourth position, the coupler disabling engine torque from being supplied to the front differential and the rear differential being locked.

37. The vehicle of claim 28, further comprising a coupler, the coupler located on the front drive train between the engine and the front differential, the mode switch being  
10 settable in a fourth position, and, in response to setting the mode switch in the fourth position, the coupler disabling engine torque from being supplied to the front differential and the rear differential being unlocked.

38. The vehicle of claim 36, wherein the mode switch is further settable in a fifth position, and, in response to setting the mode switch in the fifth position, the coupler  
15 disabling engine torque from being supplied to the front differential and the rear differential being unlocked.

39. A motor vehicle particularly adapted for off-road use and having a multimode traction system, the vehicle comprising: a pair of rear wheels, a pair of steerable front wheels, an engine for generating torque to drive the wheels, a rear differential  
20 operatively connected within a drive train and supplying engine torque to the rear wheels, a front wheel coupler means connected within the drive train and receiving engine torque, a mode switch means settable in turf mode and traction mode positions, the rear differential including a lock for locking the differential when the mode switch

means is set in the traction mode position and for unlocking the differential when the mode switch means is set in the turf mode position, the coupler means enabling torque received from the engine to be supplied to at least one front wheel to enable front wheel drive when the switch means is set in the traction mode position, and the coupler means

5   disabling engine torque from being supplied to the front wheels when the switch means is set in the turf mode position.